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Virtual Vantage Points: Using Webcams for Teleresearch

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Virtual Vantage Points

Using Webcams for Teleresearch

Figure 1.

Besides eyeglasses or contact lenses, what helps us to see what wasn't visible to us before?

A Webcam!

By Judi Harris

What's a Webcam? It's aWeb page that shows images captured by a digital camera directly connected to a computer located somewhere else in the world. The first Webcam-like online service, established in 1991, helped researchers working on different floors of one large building at Cambridge University to check the status of the automatic coffee machine in a second-floor computer lab. Webcam images can be moving or still, immediate or delayed, streaming or manually refreshed. More important than how Webcams work, though, is what Webcams can help students *do* as part of curriculum-based learning.

Hua Mei Has Me Hooked!

I first began to understand the educational potential of Webcams when a colleague introduced me to Hua Mei (hwa 'may), the first Giant Panda born in the Western Hemisphere since mid-1990. Hua Mei made her appearance at the San Diego Zoo on August 21, 1999, after her mother, Bai Yun, was artificially inseminated four months earlier. Ever since Hua Mei's birth, researchers have been using streaming cameras to study the two pandas and learn more about this endangered species. Hua Mei, which translates to "China USA" and literally means "splendidly beautiful" in Mandarin Chinese, is visited virtually every day by hundreds of thousands of interested observers worldwide who access the zoo's Panda Cam Web page (See Resources on p. 17 for a list of Webcam sites mentioned in this article). Panda Cam viewers actually get to see much more of Hua Mei and her mother than people who visit the San Diego Zoo in person. The Panda Cam's live, streamed images are viewable all day, every day, while the pandas are usually on exhibit for the

Figure 2.

Figure 3.

Figure 4.

zoo's in-person visitors for about four hours each day.

Sitting at my computer here in Austin, Texas, I "visited" Hua Mei in San Diego, California, one day as she was chewing on branches high up in a tree (Figure 1). The date and time (PT) indicated on the images were generated by the digital camera that was sending the images. Later, I watched as Bai Yun took a drink of water (Figure 2). The Panda Cam also lets us see the pandas' indoor accommodations at the zoo (Figure 3).

Often, the Panda Cam shows us how Hua Mei and her mother interact. For example, they appeared to be playing in this picture (Figure 4). But, were they playing, or was I personifying their actions? In this question is the seed of a highly engaging, educationally sound possibility for the exploration of inferences and observational methods in the context of animal ethology—the study of animal behavior.

What's Really Going On Here?

Observing animal behavior, inferring the purpose and nature of the behavior, then doing research and more observation to test the validity of these inferences could enrich science study for learners of any age. For example, one day when I checked in on Hua Mei and her mother, I was excited to see a close-up of behavior similar to what I had observed earlier at the site (Figures 5–7).

What were they doing? What was the purpose of their actions? Why did it

Figure 5.

Figure 6.

last as long as it did? How frequently do we see the pandas engaged in actions like these? How has this pattern of activity changed over time, and why have these shifts occurred? How long will this behavior continue? Questions such as these can fuel valuable observational studies for students, helping them to learn not only about pandas and their behavior but also about how to record and analyze observational data, test inferences, use information resources to interpret observational data, and make and test predictions.

A Plethora of Possibilities

Aquariums, aviaries, and zoos are making their exhibits available online using Webcams. Animal shelters and private homes have Webcams that let us watch pets of all different ages and varieties. Annotated indexes of these different animal-related Webcams are offered by educational organizations, Webcam companies, and hobbyists.

Digital cameras that output to Web pages are also pointed at many other interesting phenomena that directly relate to K–12 curricula. For example, there is a Webcam showing the view from an astrophysical observatory at the South Pole, of Old Faithful geyser's eruptions in Yellowstone National Park, and from a geostationary satellite high above Earth. Outdoor views of beaches, mountains, seascapes, and other landscapes are also viewable online, as are views of weather conditions, traffic, and businesses. One family even allows us to watch the growth and development of their baby daughter, Kimberly, at Baby Cam, one of Discovery Online's many fascinating Webcam sites. Webcams let us observe weddings in Las Vegas; the Kremlin in Moscow; and even places in Ireland where ghosts are said to have been sighted.

Webcams have enormous potential for curriculum-based teleresearch activities in which students collect and use observational data in different ways. Teleresearch learning activities are those in which students locate and use online information. In most cases, that information has been placed online as a result of another learner or teacher synthesizing it. Using Webcams, teleresearch can occur in real time, helping students to collect raw data on beings, objects, and situations located far from where the students are learning.

For example, students could:

- Chart the frequencies and lengths of wedding ceremonies at A Little White Chapel in Las Vegas, Nevada, to see if there are predictable patterns of occurrence or duration of wedding ceremonies on different days and at different times.
- Using the Baby Cam, keep records of Baby Kimberly's activities to see whether she has a predictable schedule, and if so, whether that sequence of activities changes over time as she matures.
- Map people's movements at three-minute intervals along the Champs-Elysées in Paris to see if they are predictable across walkers or idiosyncratic to each person viewed.
- Observe and record finch behavior, such as preening and interactions with other finches at regular intervals, offering hypotheses as to the purposes of the finches' movements. Students could then check the accuracy of their hypotheses by reading about bird behavior on the Web and in the school library.

It's important to note, however, that some Webcams are frequently inaccessible, because of persistent tech-

Figure 7.

nical difficulties, congested network traffic, or preset, limited viewing schedules. When planning a learning activity that incorporates Webcams, it is best to have several sites preselected or to use a Webcam that offers both live images and galleries of past images, such as the Toledo Zoo's Animal Cams or Panda Central. If possible, test sites' ease and speed of access at the time of day that students will be using them before completing your plans for a learning activity that incorporates Webcams.

More To Come!

More than one half-million digital cameras are sold each year. With USB connections as standard equipment on many later-model personal computers and free or inexpensive Webcam software making it very easy to set up new Webcams, real-time views will continue to increase in number, diversity, and creativity. Although most Web users now think of Webcams as entertainment, as teachers, we can help K–12 students use these powerful windows on our world in creative and curriculum-based ways. We're just beginning to imagine educational possibilities for these virtual vantage points!

Resources

Webcam Setup:

http://netconference.about.com/internet/netconference/cs/webcamsetup/index.htm

Webcam Mega-indexes:

A Bird's Eye View of Webcams: www.abirdseyeviewof.com/WIE.html

Camcity: www.camcity.com/index2.html

Directory of Webcam Indexes: http://dmoz.org/Computers/Internet/WWW/Webcams/Directories/

EarthCam for Kids: www.earthcamforkids.com/

WebCam Central: www.camcentral.com/

Specific Webcam sites:

Amazing Animal Cams: www.earthcamforkids.com/cgi-bin/ksearch_cam.cgi?subject:ANI;file:KANI

Animals Webcams: http://webcamsat.net/cgi-bin/wcs/category.cgi?cat_id=10

Automated Astrophysical Site-Testing Observatory: http://bat.phys.unsw.edu.au/~aasto/

Baby Cam: www.discovery.com/cams/baby/baby.html

Champs-Elysées: www.allocine.fr/live/

Discovery Cam Universe: www.discovery.com/cams/cams.html

FinchCam: http://cbt.bungi.com/finchcam/

Geostationary Satellite Images of the Earth: www.goes.noaa.gov/HTML/FRAMED/f_gms.html

Ghost Cam: www.discovery.com/cams/ghost/ghost.html

Hua Mei at Panda Central: www.sandiegozoo.com/special/pandas/hua_mei/index.html

Kremlin Cam: www.discovery.com/cams/kremlin/kremlin.html

Old Faithful: www.nps.gov/yell/oldfaithfulcam.htm

Orca Cam: www.orca-live.net/top_nfla.html

Panda Cam: www.sandiegozoo.com/special/pandas/Panda Cam/index.html

Science/Museums Webcams: webcamsat.net/cgi-bin/wcs/site.cgi?site_id=38

Toledo Zoo's Animal Cams: www.toledo.com/zoocams/index.html

Trojan Room Coffee Machine: www.cl.cam.ac.uk/coffee/coffee.html

View Outdoors Webcams: http://webcamsat.net/cgi-bin/wcs/category.cgi?cat_id=18

Wedding Cam: www.discovery.com/cams/wedding/wedding.html

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